

Open Source Licensing for Rocket Scientists

Andreas Schreiber, Carina Haupt

German Aerospace Center (DLR)
Intelligent and Distributed Systems Dept.
Cologne, Berlin

FOSS Backstage Micro-Summit 2017

A large, high-resolution image of the Earth as seen from space, showing the curvature of the planet, blue oceans, white clouds, and green landmasses. The image is positioned on the right side of the slide, partially overlapping the text.

Knowledge for Tomorrow

Introduction



**Deutsches Zentrum
für Luft- und Raumfahrt**
German Aerospace Center

Simulation and Software Technology, Cologne/Berlin
Head of Intelligent and Distributed Systems department

Institute of Data Science, Jena
Head of Secure Software Engineering group



**Co-Founder
Data Scientist
Patient**



DLR

German Aerospace Center



- Research Institution
- Space Agency
- Project Management Agency



Locations and employees

Approx. 8000 employees across
40 institutes and facilities at 20 sites.

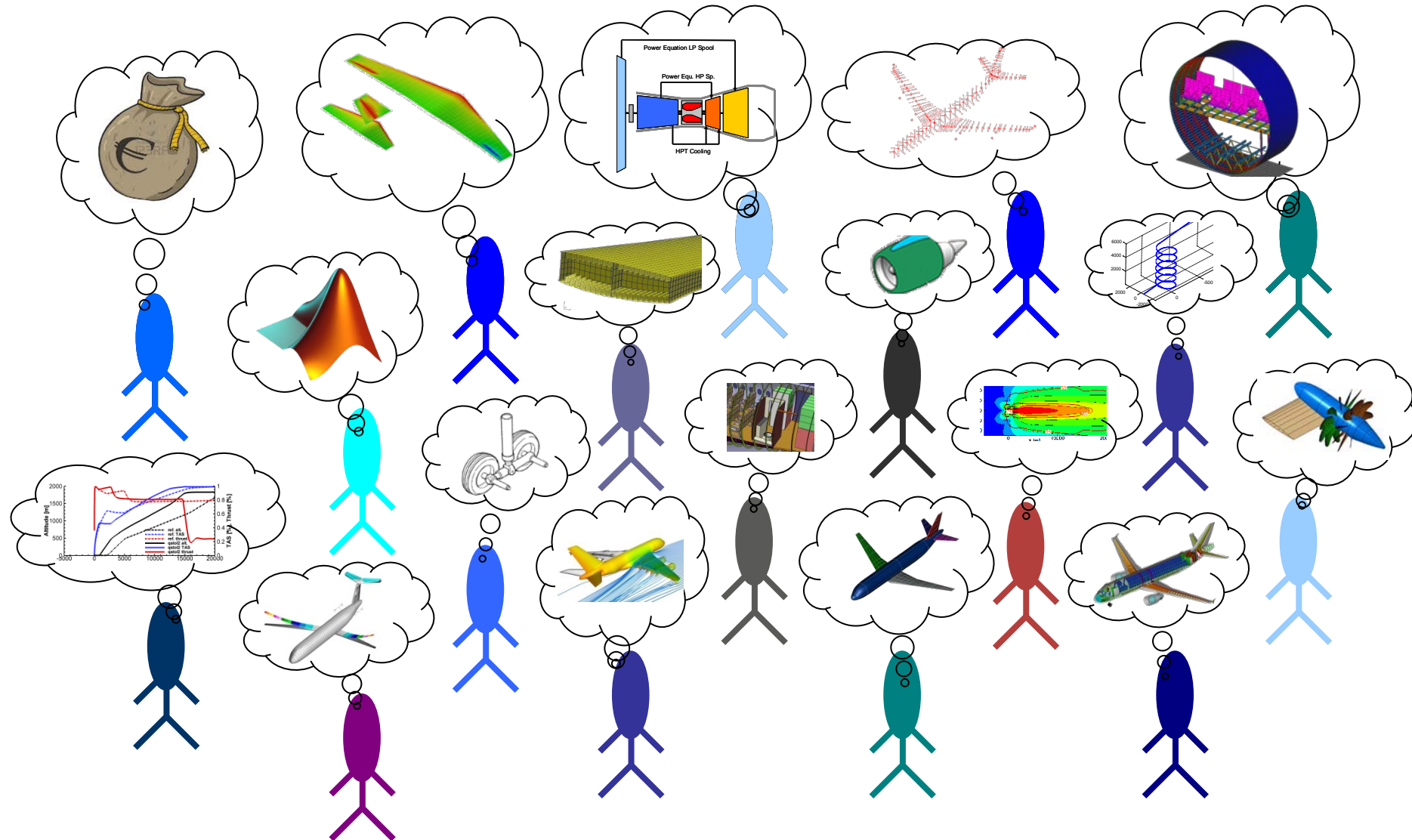
Offices in Brussels, Paris,
Tokyo and Washington.



Free and Open Source Software

*„Free as in ‘freedom’,
not as in ‘free beer’“*

Software at DLR



Software Development at DLR

Some numbers...

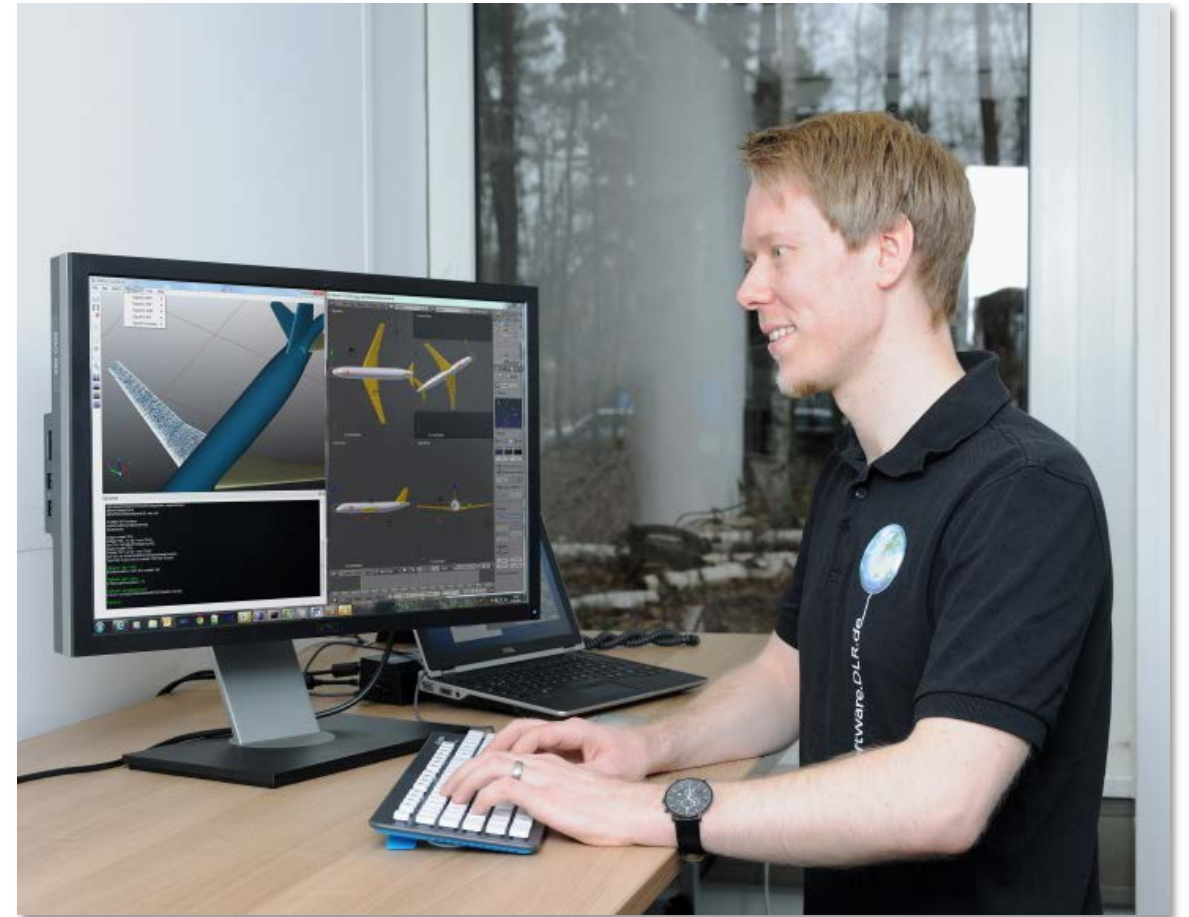
- More than 1500 employees develop software
- More than 150 Mio EUR personnel costs per year for software development
- DLR is one of the biggest „software company“ in Germany



Software Development at DLR

Characteristics

- „Developer“ often do not have any training in software development
- Huge amount of software projects
- Variety of used software technologies



Software Development at DLR

Variety

- Many different software technologies used
 - For example, more than 30 programming languages
- Open Source Software as well as proprietary software
 - Many different licenses
- Huge number of software projects
 - Overview about existing projects is *hard not possible*

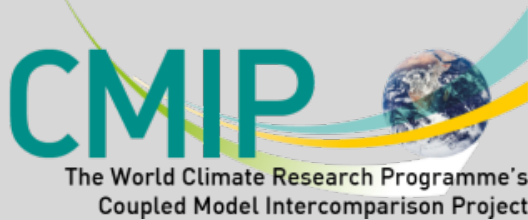
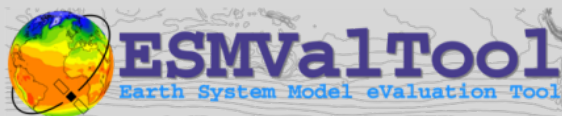


Examples for Open-Source-Software from DLR

Development and usage together with external partners

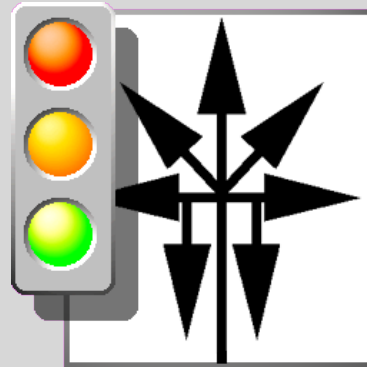
ESMValTool

- Earth System Model eValuation Tool
- www.esmvaltool.org



SUMO

- Simulation of Urban Mobility
- www.sumo.dlr.de

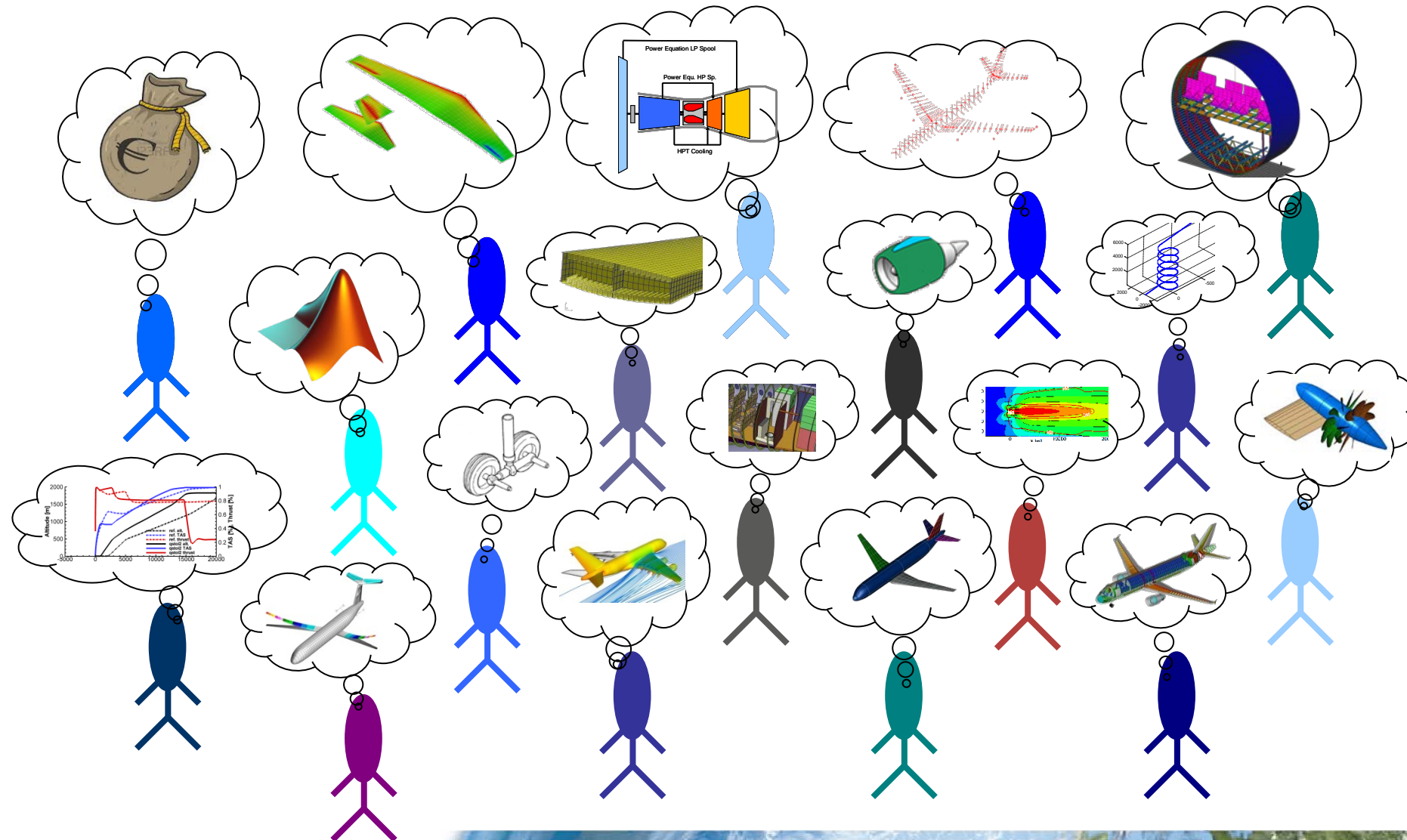


RCE

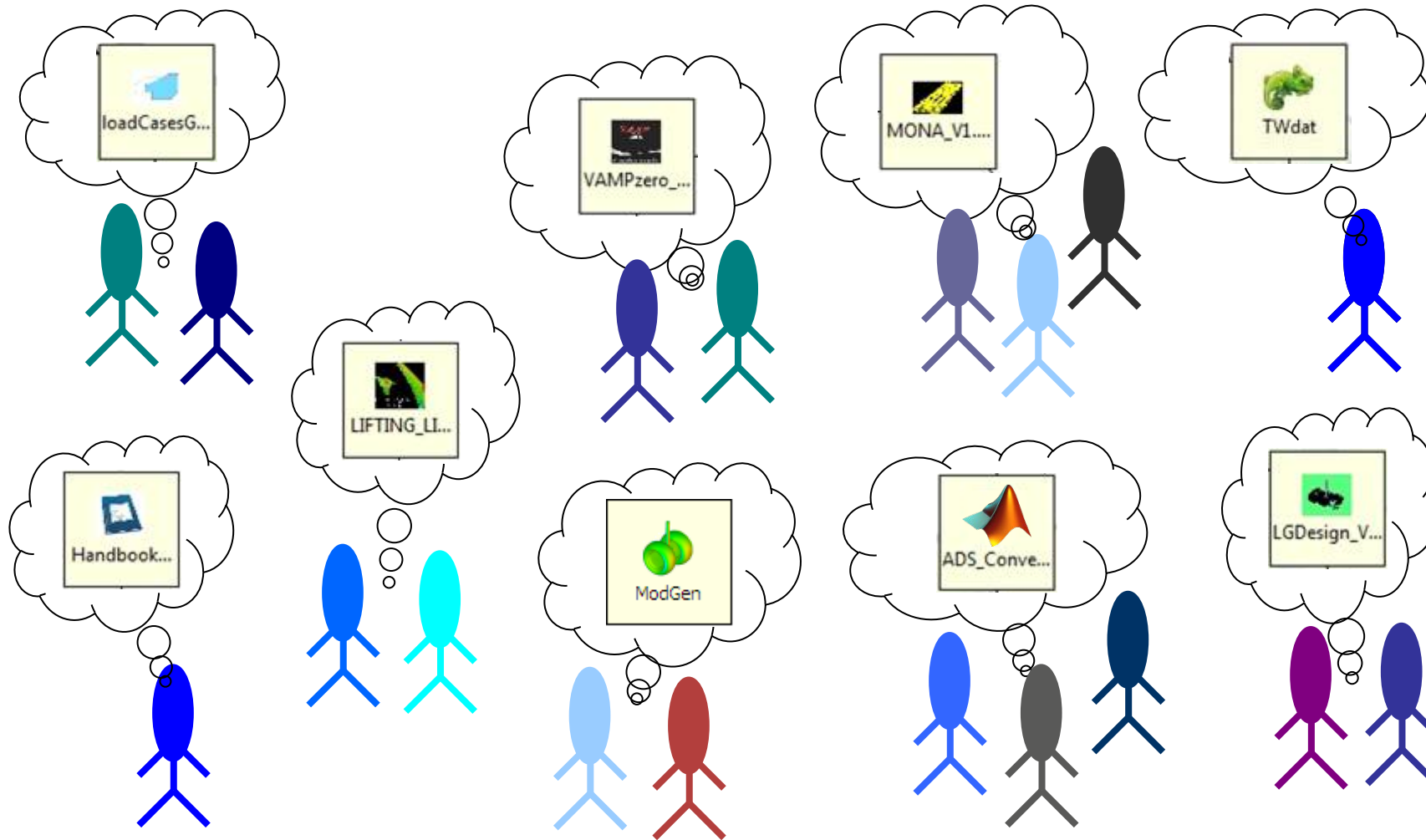
- Remote Component Environment
- rcenvironment.de



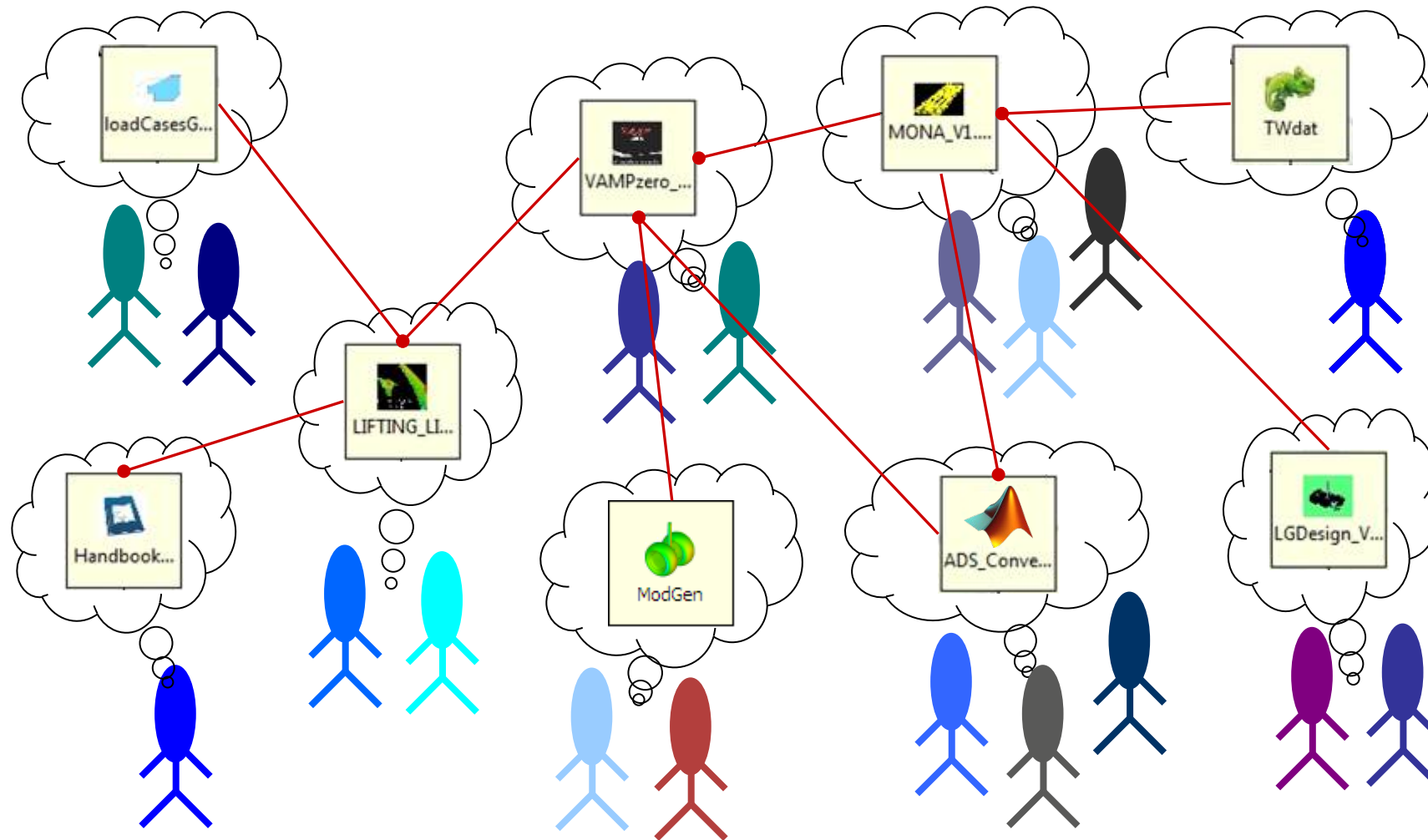
Domain Knowledge



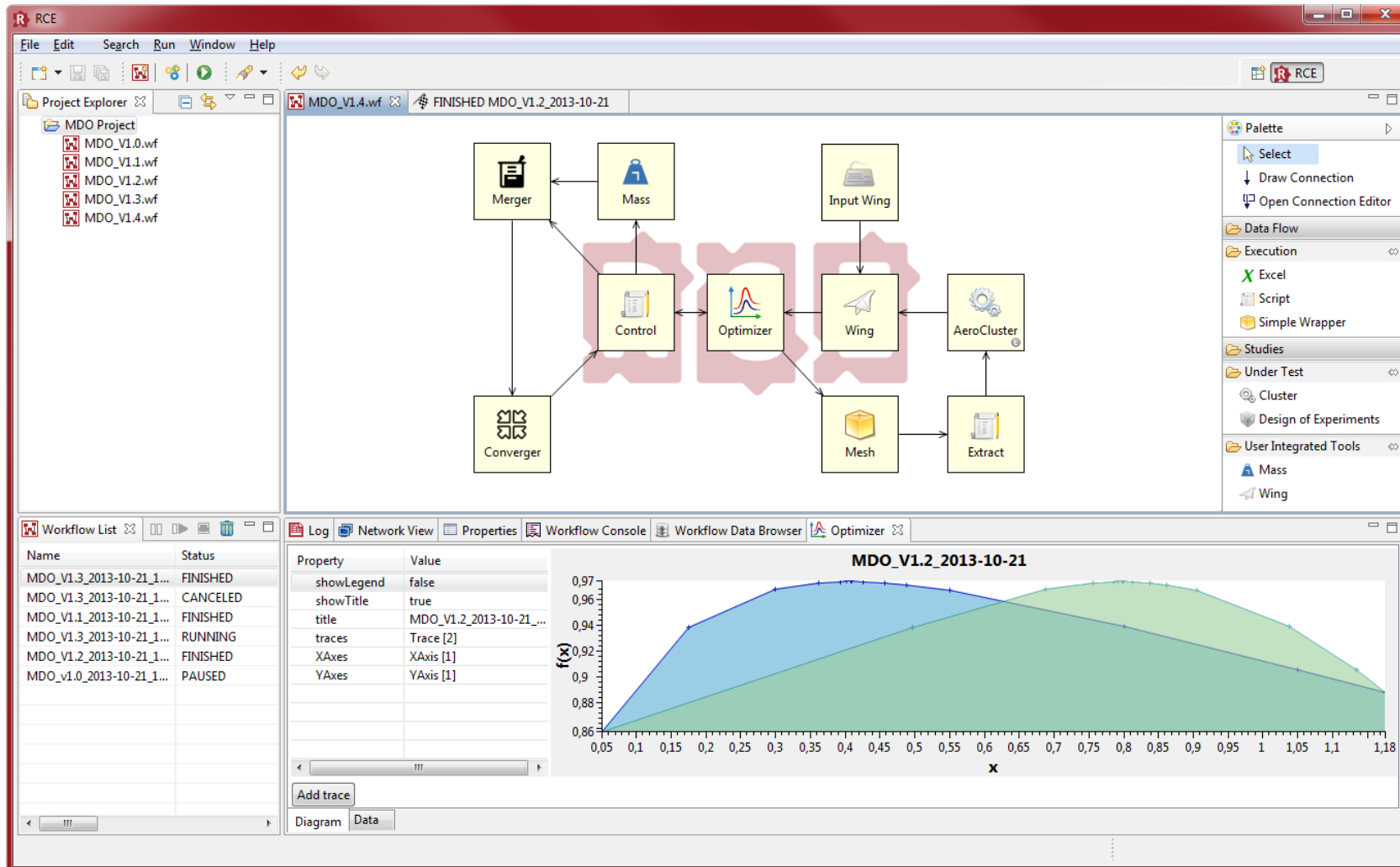
Knowledge represented in Software



Collaboration and Cooperation



Distributed Design Processes



Concurrent Engineering



Results



Open Source at DLR

A large, curved portion of the Earth is shown in the bottom right corner of the slide. The image captures the curvature of the planet, with a deep blue atmosphere at the top edge. Below the atmosphere, white clouds swirl over a green landmass, which appears to be Europe. The land is detailed with various shades of green and brown, indicating different terrain types. The overall image has a high-resolution, satellite-like quality.

Knowledge for Tomorrow

Problems of the Past

- Software with license issues was published
- License compatibility of used software was not fulfilled
- Colleagues did not know which open source license would suit best
- Colleagues did not know which requirements for the source code had to be fulfilled



Warnings and Tips for Open Source (2012)

1. Open-Source-Lizenzbedingungen haben grundsätzlich Rechtsgültigkeit, d.h. ein Verstoß gegen diese Bedingungen stellt eine Urheberrechtsverletzung dar.
2. Die unbefugte Weitergabe von Open-Source-Software an Dritte (z.B. i.R.v. Aufträgen) kann zu gravierenden Haftungstatbeständen führen. Das gleiche gilt, wenn im Rahmen von Drittmittel-Projekten verschwiegen wird, dass vom DLR entwickelte Software Open-Source-Komponenten enthält.
3. Open-Source-Software wirkt in der Regel infizierend: Abhängig von den Lizenzbedingungen (z.B. GPL) kann bei einer engen Koppelung von selbst entwickelter Software mit von Dritten entwickelter Open-Source-Software der Effekt eintreten, dass die Lizenzbedingungen der Open-Source-Software für die gesamte Software gelten müssen.
4. Open-Source-Lizenzbedingungen sind untereinander teilweise inkompatibel, d.h., bestimmte Open-Source-Komponenten können nicht miteinander kombiniert werden, ohne gegen eine der Lizenzbedingungen zu verstoßen.



Developer vs. Licenses

Results of a recent study:

*“... we conducted a survey that posed development scenarios involving three popular open source licenses (GNU GPL 3.0, GNU LGPL 3.0 and MPL 2.0) both alone and in combination. The 375 respondents to the survey, who were largely developers, gave answers consistent with those of a legal expert's opinion in 62% of 42 cases. **Although developers clearly understood cases involving one license, they struggled when multiple licenses were involved.**”*

Daniel A. Almeida, Gail C. Murphy, Greg Wilson, and Mike Hoyer. 2017.

Do software developers understand open source licenses?.

In *Proceedings of the 25th International Conference on Program Comprehension (ICPC '17)*.

IEEE Press, Piscataway, NJ, USA, 1-11. DOI: <https://doi.org/10.1109/ICPC.2017.7>



Measures at DLR

Information and trainings

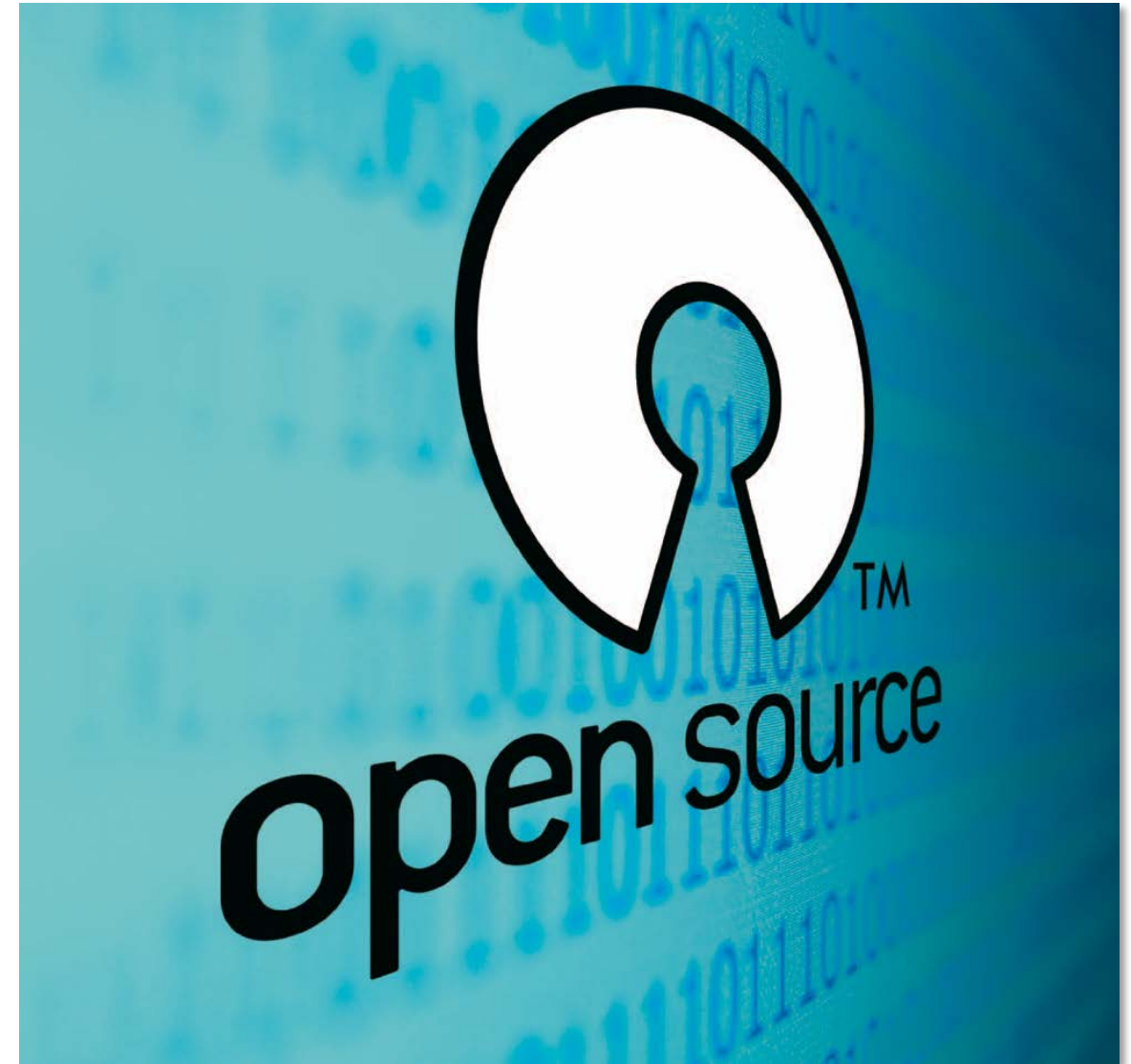
- Training on licenses
- Brochure

Knowledge exchange

- Wikis
- Knowledge-Exchange-Workshops

Consulting and support

- Recommended licenses
- Support



Information and Trainings



Knowledge for Tomorrow



Training on Open Source Licensing

„Legal aspects of open source usage“

- Official and regular training in the DLR education program
- Every DLR employee can participate
- Short training (currently about 4 hours)
- Run by two persons
 - Legal expert of DLR technology marketing (Dep. licenses and patents)
 - Software engineer of DLR facility simulation- and software technology

Introduction to open source

Legal basics

Open source software

Selected open source licenses

Usage of open source software



Training „Legal aspects of open source usage“

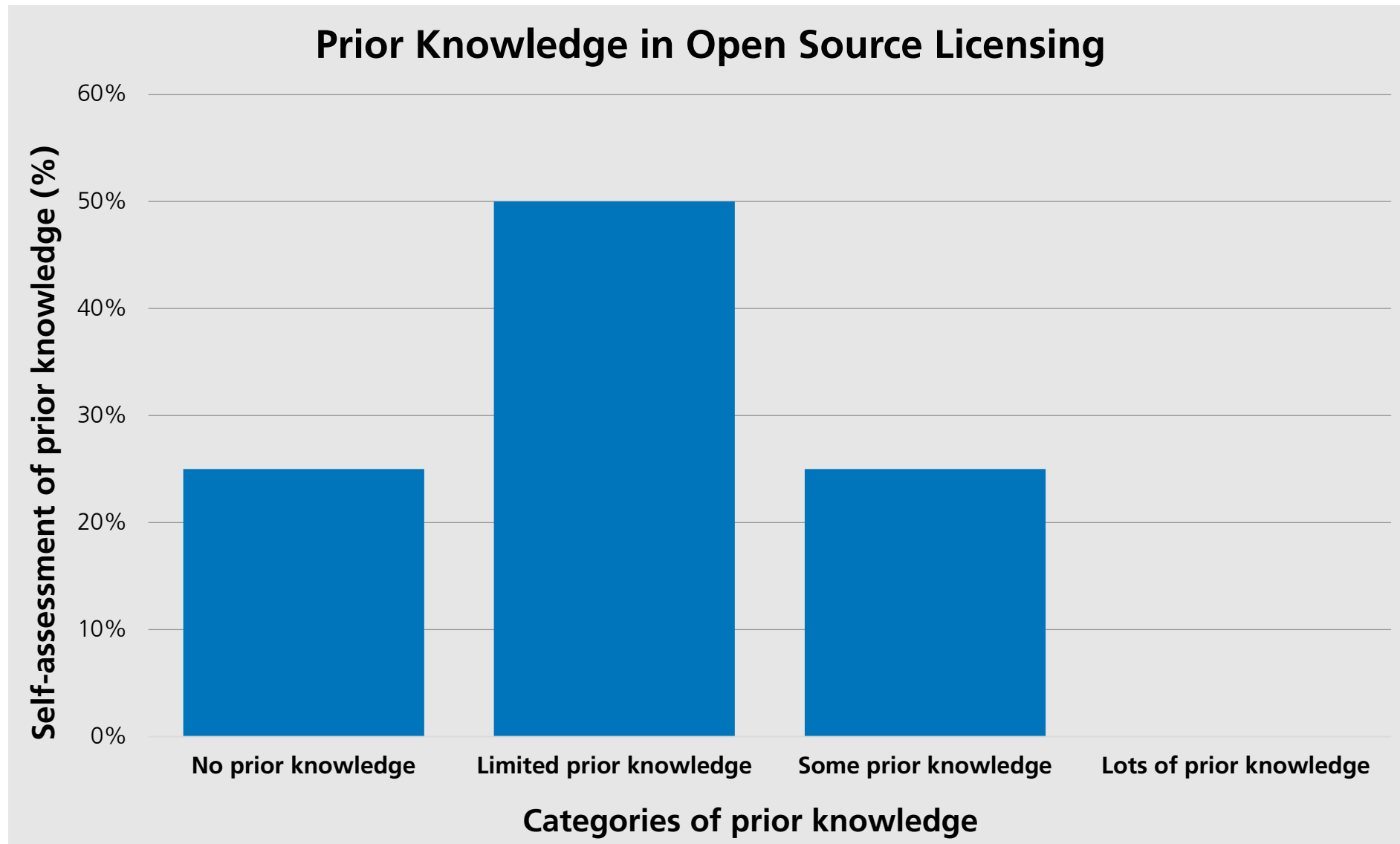
Introduction to Open Source	Legal Basics	Open Source Software	Selected Open-Source Licenses	Usage of Open Source Software
<ul style="list-style-type: none"> • Open Source and Free Software • Philosophy of Open Source • Open Source at DLR 	<ul style="list-style-type: none"> • Copyright • Liability • Warranty • Contract law • Ownership 	<ul style="list-style-type: none"> • Software licenses • • Definition of “Open Source” • Types of Open Source licenses • Copyleft 	<ul style="list-style-type: none"> • GPL, AGPL, LGPL • Eclipse Public License • BSD License • Apache License • Artistic License 	<ul style="list-style-type: none"> • Individuality of software • OSS in own projects • License compatibility • Development of OSS • Distribution of OSS



Training Participants

Year	Participants	DLR Site
2012	32	Oberpfaffenhofen
2013	23	Berlin, Köln
2014	12	Stuttgart
2015	9	Berlin
2016	14	Köln



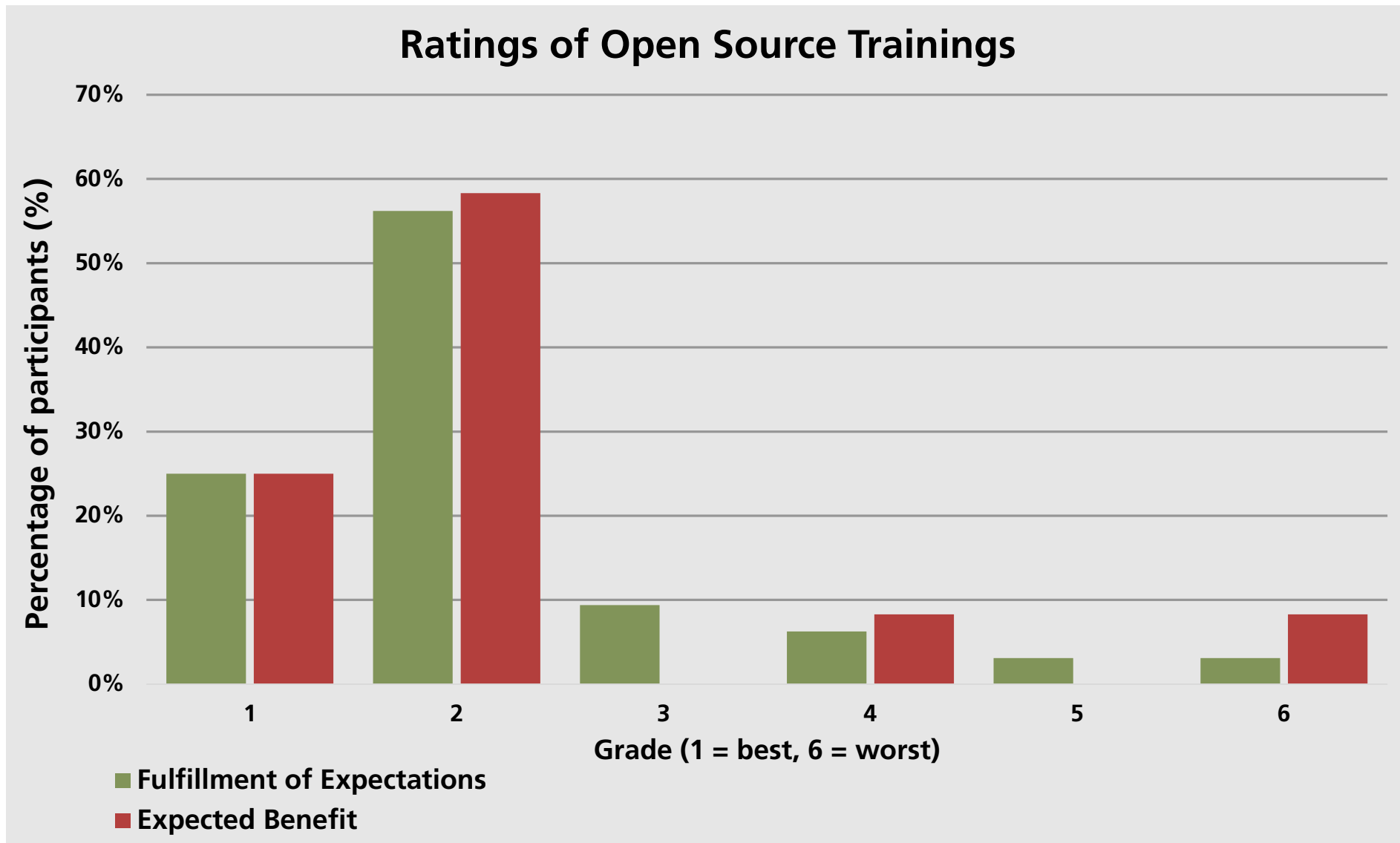


Expectations of Participants

Query of expectations bevor the training (*extract*)

- To learn which aspects have to be taken in account in a project
- Get an overview over open source license models
- Learn how to use open source software in closed source projects
- Get to know examples from within DLR
- Learn the legal basics
- To learn and understand personal consequences for license violations





Open Source Brochure

Information about legal basics

- Basics about open source license law
- Developed by a law firm
- Funded and published by DLR Technology Marketing



Open Source Brochure – Content

Two main chapters

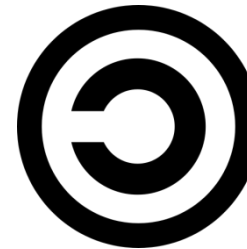
- Distribution of *unmodified* code
- Distribution of *modified* code

In both chapters: Lists of all liabilities for licenses, which are widely used at DLR

- BSD, Apache, GPL, MIT, ...

Licenses

- with strong copyleft
- with weak copyleft
- without copyleft
- with special rights



Open Source Brochure

Practical Information

Checklisten

Infoboxen

Weitergabe veränderter Software

6 Lizenzen mit strengem Copyleft

GNU General Public License Version 2 (GPLv2)

- ☐ Mitliefern des Lizenztexts (siehe Merkbox 1, S. 10)
- ☐ Zugänglichmachung des Quellcodes (s.o. Merkbox 2, S. 10)
- ☐ Vollständiger korrespondierender Quellcode (s.o. Merkbox 3, S. 11)
- ☐ Urhebervermerk (s.o. Merkbox 4, S. 11)

Beibehalten der vorbestehenden Urhebervermerke (s.o. Merkbox 4, S. 11)
Anbringen neuer Urhebervermerke

Merkbox 11

Bei der Veränderung der Software sind vorbestehende Urhebervermerke beizubehalten (s.o. Merkbox 4, S. 11) und neue Urhebervermerke in den hinzugefügten Dateien anzubringen.

Wie gestalte ich einen neuen Urhebervermerk?

Im Header der Quellcode-Dateien ist der Vermerk „© [Jahreszahl], Deutsches Zentrum für Luft- und Raumfahrt e.V., author: [Name]“ anzubringen.

- ☐ Disclaimer (s.o. Merkbox 5, S. 11)
- ☐ Änderungsvermerk

in den geänderten Quellcode-Dateien.


Merkbox 12

Wie gestalte ich den Änderungsvermerk?

Der vorbestehende Urhebervermerk ist beizubehalten und ein kurzer Hinweis auf die hinzugefügte/geänderte Funktion mit Datumsangabe und Namensnennung des Deutschen Zentrums für Luft- und Raumfahrt e.V. sowie des Autors der Änderung.

Der Urhebervermerk kann dabei wie in Merkbox 11, S. 24 aussehen.

- ☐ Hinweispflichten bei interaktiven Kommandos

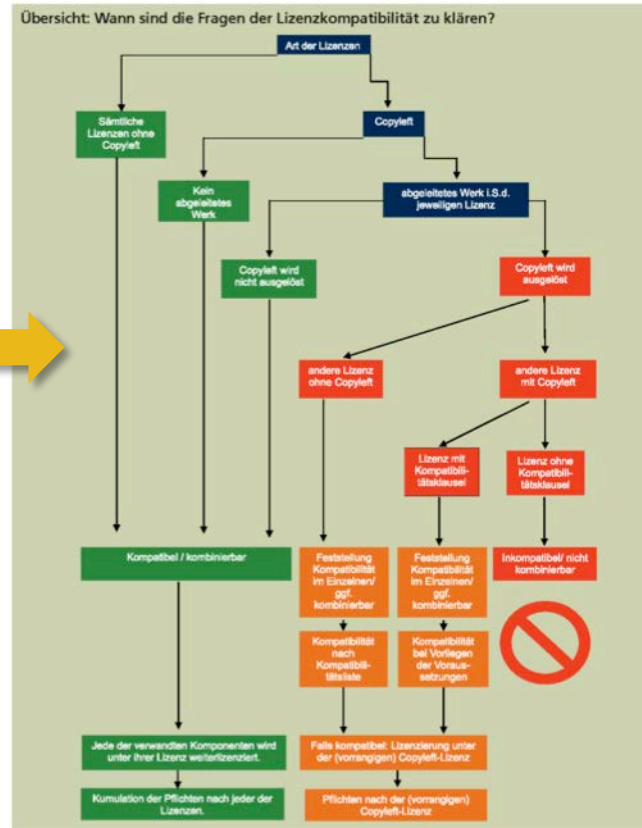
24 

Open Source Brochure

Help for Decisions

Entscheidungs-
baum

11 Anhang



Knowledge Exchange

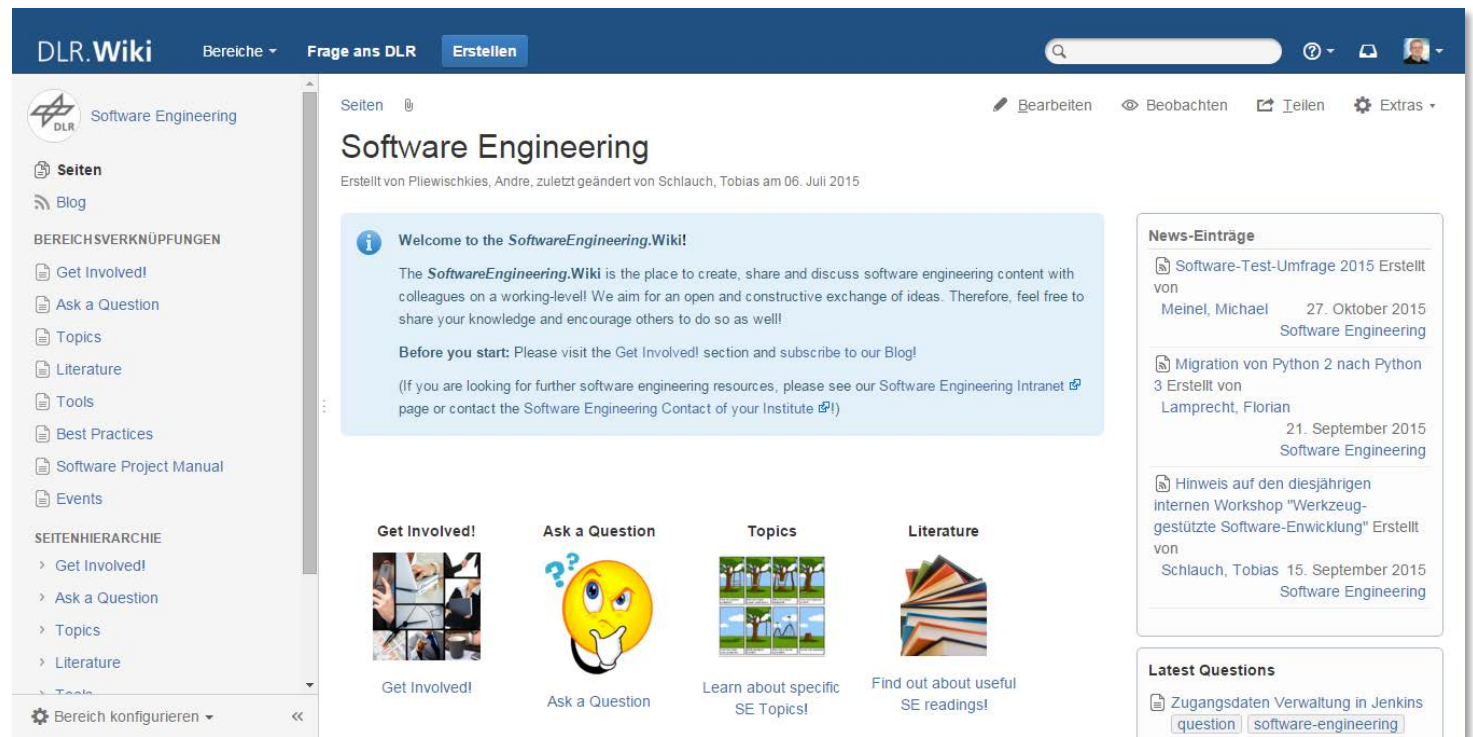


Knowledge for Tomorrow



Wikis

- Originally, we had many different Wiki installations at DLR
- Since 2013, one central DLR.**Wiki** based on Atlassian Confluence
- Wikis for
 - Software Engineering
 - Events
 - ...



DLR.Open Wiki

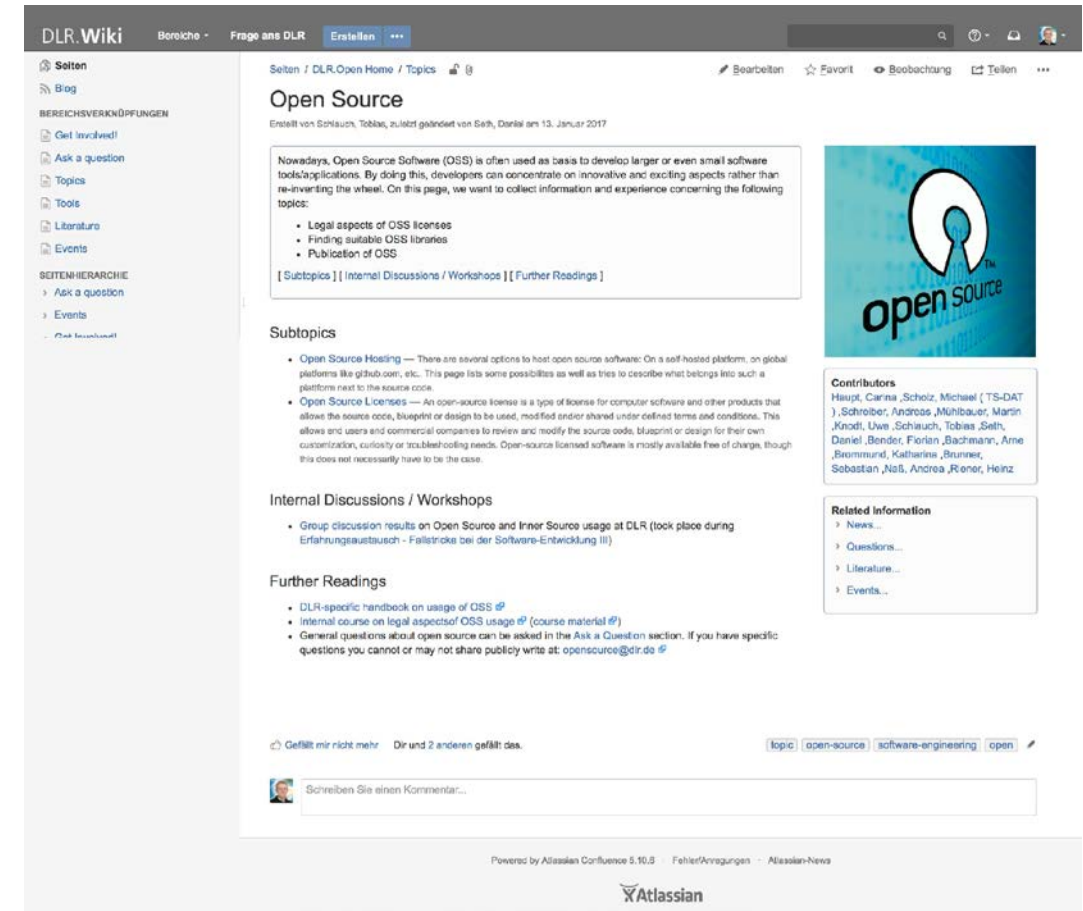
About everything *open* related

Categories

- Topics
- Tools
- Literature
- Q&A
- Events

Most information may also be found in the web, but also DLR specific information

Single-Point-of-Information at DLR



The screenshot shows the DLR.Open Wiki interface. The header includes the DLR.Wiki logo, navigation links like 'Bereiche', 'Frage ans DLR', and 'Erstellen', and a search bar. The left sidebar contains a 'Seiten' menu with links to 'Blog', 'Bereichsverknüpfungen', and 'Seitenhierarchie'. The main content area is titled 'Open Source' and includes a description of Open Source Software (OSS), a list of topics (Legal aspects of OSS licenses, Finding suitable OSS libraries, Publication of OSS), and sections for 'Subtopics', 'Internal Discussions / Workshops', and 'Further Readings'. A right sidebar features a 'Contributors' list and 'Related Information' links. The footer mentions 'Powered by Atlassian Confluence 5.10.3' and the Atlassian logo.

KnowledgeExchangeWorkshops

WissensAustauschWorkshops (WAWs)

Workshops for knowledge exchange
between DLR employees (peer-to-peer)

We have KnowledgeExchangeWorkshops for
many topics

- Software Engineering
- Visualization of huge data sets
- Autonomous flying
- Photonic systems
- DLR.Open (incl. Open Source)



WissensAustauschWorkshop
DLR.open
18. - 19. Oktober 2016 in Köln-Porz, Casino

Jetzt kostenlos anmelden
bis 21. September 2016
über das Bildungsprogramm
im Intranet

Kontakt:
Philipp Bergeron
4002

Mehr Details unter:
wissen.DLR.de/waw

Eine Initiative des
Wissensmanagements im DLR

DLR

Source, Data, Access, Hard Software, Education, Science, OPEN

KnowledgeExchangeWorkshops

Open to any DLR employee

- Up to 60 participants

Interactive program

- Short impulse lectures
- Personal introduction
- Lightning talks
- Discussions / working in small groups





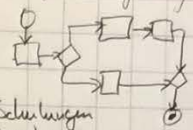
Michael Meinel, Simulations- und Softwaretechnik Software-Engineering

Biete

Software-Engineering

Prozesse

Werkzeuge



Schulungen
Beratung

Python ... auch mit anderen Sprachen (F2x)

↳ Fortran ... github.com/DLR-SC/F2x

Continuous Integration

Software-Tests — Werkzeuge und Methoden

Werkzeuge - f. Workflow-Überwachung und -kontrolle (Wo läuft es?)

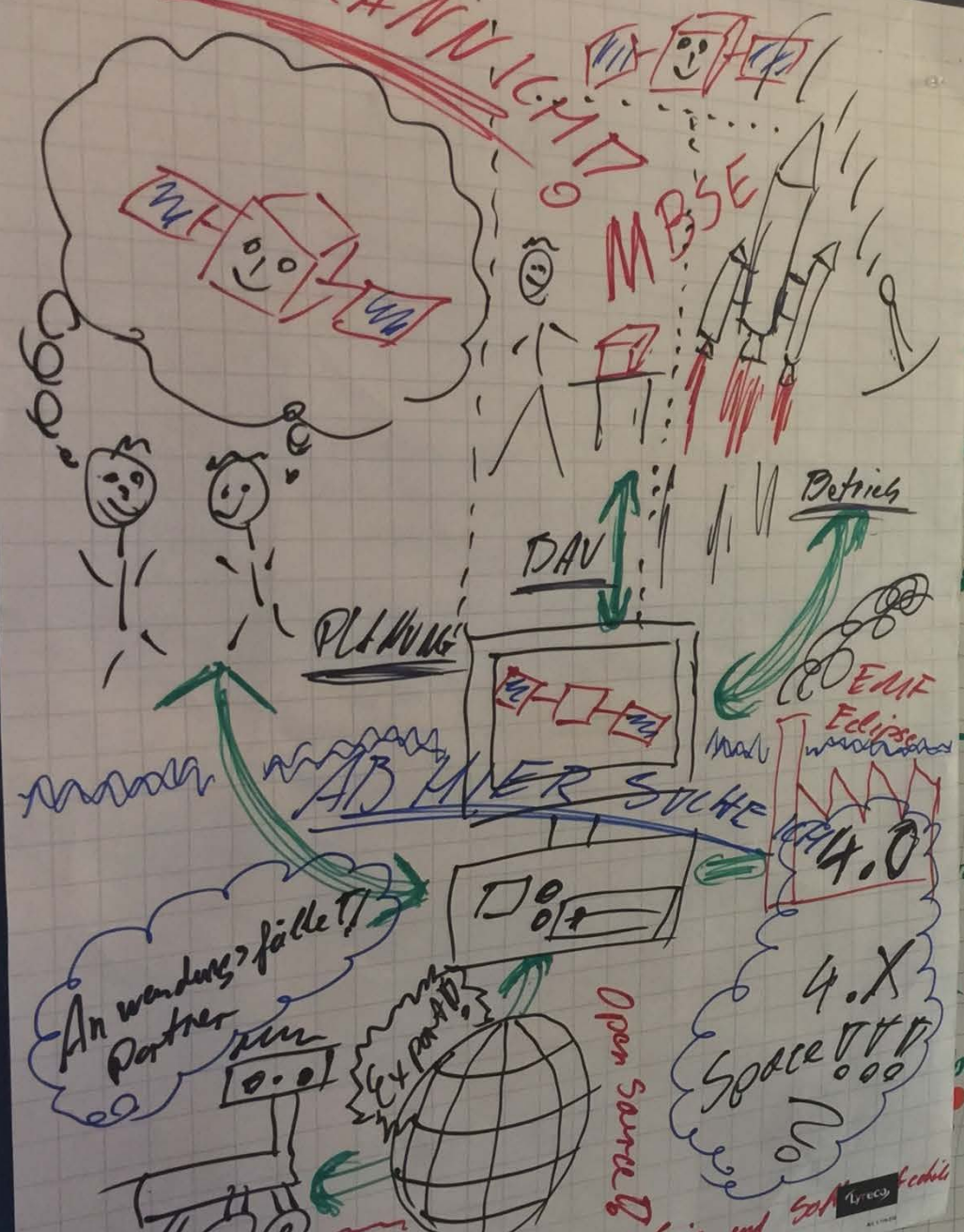
- Bewertung (Was hilft?)

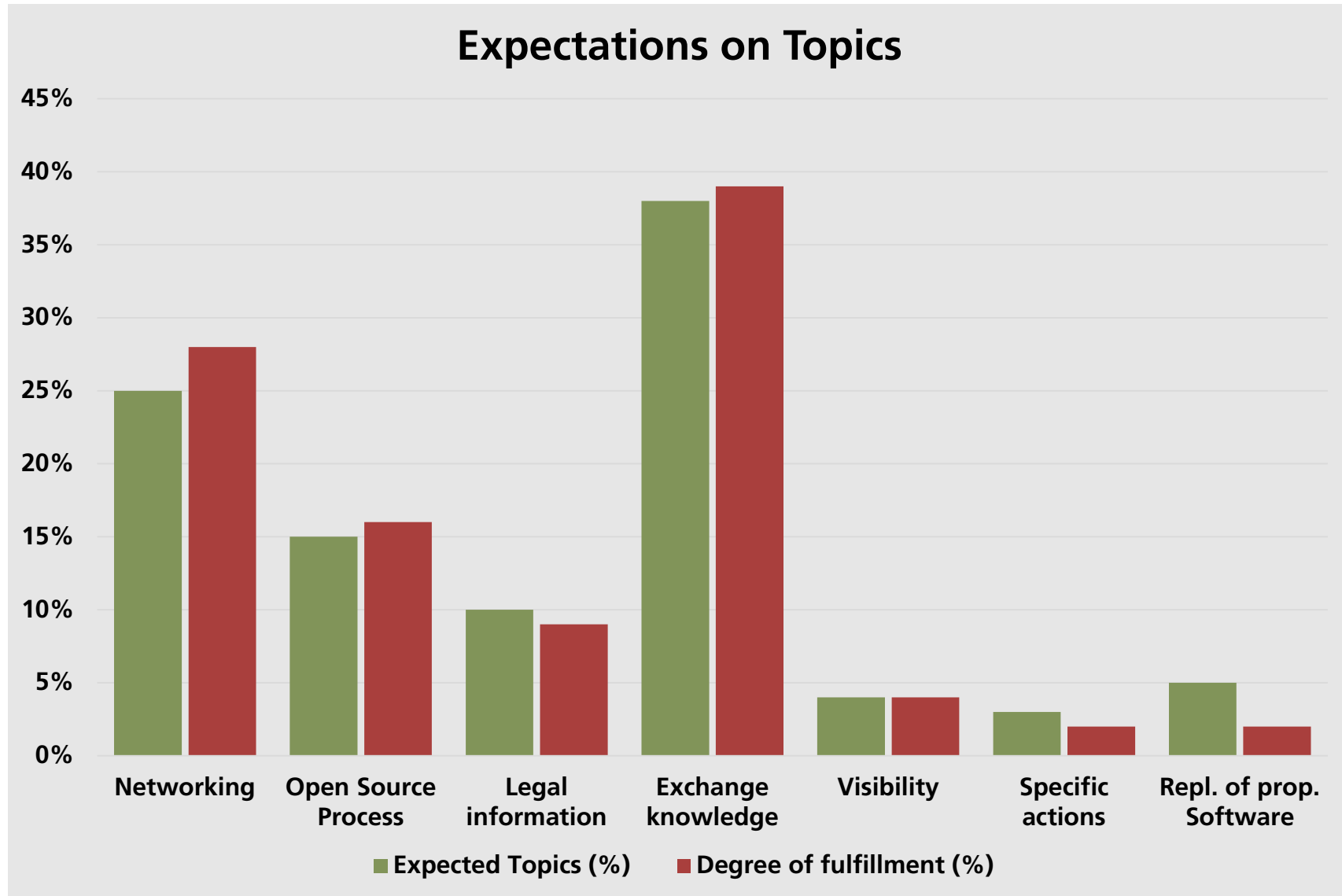
Sicherheit Welche Gefahren gibt es?
Wie unterschiedlich ist sichere SW?

Projekte f. Fortran - Anbindung an ...
Python, Java, C#, ...

Stufe

DAS KANNICH





Lessons Learned from the KnowledgeExchangeWorkshops

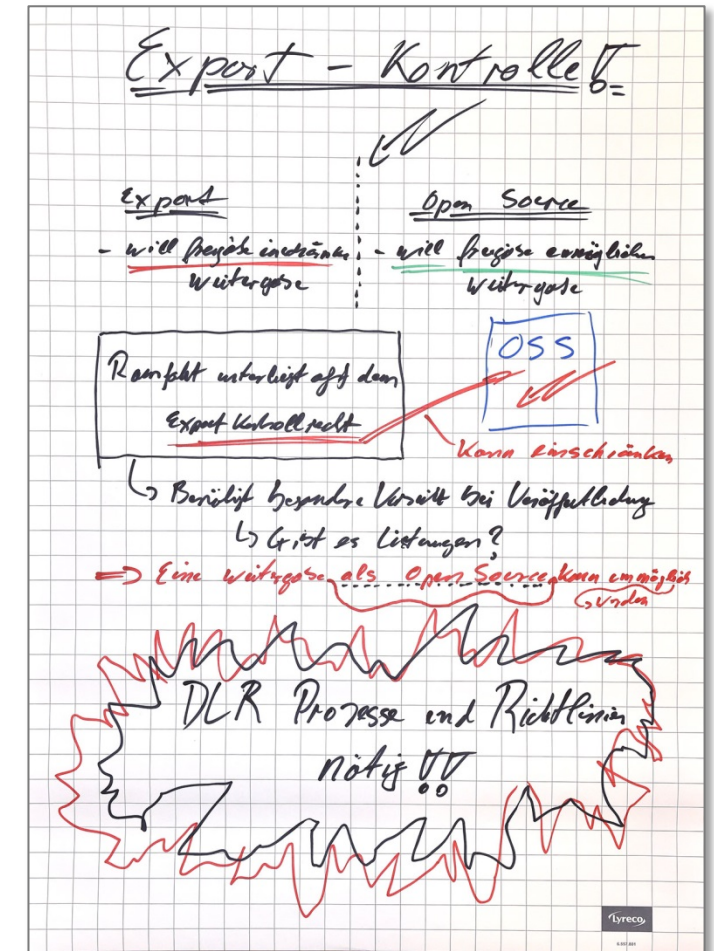
General findings

- Open source software is already widely spread at DLR
- Open source software mainly is used in the form of open tools and libraries
- Own research software still mainly closed source
- Eager interest to publish own software

Critic of Open Source

- Missing opportunity to earn money
- Community build up is resources consuming
- Additional burden of time is demotivating

General DLR process to handle open source is missing



Consulting and Support



Knowledge for Tomorrow



Help on Licensing Issues

Individual help and support

- General license questions, property rights
→ DLR technology marketing
- Legal support for copyright or further legal questions
→ DLR legal department
- License compatibility, license selection, development
→ DLR simulation and software technology

Email as central point of contact

→ opensource@dlr.de

Typical Topics

- Criteria for choosing an Open-Source-Software
- Best-Practices for own Open Source projects
- Migration from commercial and proprietary software to Open Source software



Recommended Licenses

Default licenses, approved by DLRs legal department

- Simplified BSD License
- Apache License 2.0
- Eclipse Public License 1.0

DLR will not develop its own Open Source license

- In contrast to related organizations (NASA, ESA, ...)



Wiki

Q&A section of the DLR.Open wiki

DLR.Wiki

Bereiche -

Frage ans DLR

Erstellen

...

Seiten / SVN / Software Engineering

Bearbeiten

Favorit

Beobachten

Tellen

...

Ask a Question

Angelegt von Schaub, Tobias, zuletzt geändert am 10. Februar 2017

Do you have a programming problem? You heard about a cool tool but you do not know whether it is useful in your situation? We might be able to help you!

On this page you can easily ask your programming or software development related question!

- If you want to ask a Question...
- If you want to answer a Question...
- If you - as the questioner - want to mark a Question as answered...

Ask a Question

Question	Status	
I want to upstream a (small) patch, what form of signoff do I need from whom?	ANSWERED	3
Was sollte an Mindestvorgaben für das Software-Testen etabliert werden?	ANSWERED	5
Perl Distribution für Windows im DLR	ANSWERED	5
Abfrage der SVN-Revisionsnummer eines Python-Skripts	ANSWERED	5 1
Einführung von Versionsverwaltung	OPEN	3
	ANSWERED	
Simpack User Routines	ANSWERED	4
Zugriff auf Python Modul	ANSWERED	6
Jenkins-Mantis	OPEN	1 1
Zugangsdaten Verwaltung in Jenkins	ANSWERED	3
3D Animation mit Python	ANSWERED	5
Java IRC Chat	ANSWERED	8
Schulung Jasper Reports und iReport Designer	OPEN	2
Tools for Software Development Project Management (Requirements, Specification, Monitoring)	ANSWERED	2 1
Welche Python-Distribution?	ANSWERED	10 2
Tools zum Testen von GUIs / HMIs	OPEN	3 1
self Objekt in Python ersetzen	ANSWERED	2 1
Wie kann der Fehler bei der Auto Completion in Eclipse Luna gelöst werden "Compilation unit is not on the build path of a Java project"??	ANSWERED	2

Gefällt mir 6 Personen gefällt das.

questions navigation software-engineering

Schreiben Sie einen Kommentar...

Contributors

Schaub, Tobias, Gatter, Alexander, Potoczny, Philipp, Rökling, Andreas, Calaminius, Bastian, Gormann, Lukas, Meinel, Michael, Rooney, Daniel, Bachmann, Arne, Gösfert, Tobias, Munteanu, Robert, Schulz, Susanne, Unbekannter Benutzer (ruwe_ru), Amore, Mario d', Haupt, Carina, Handrik, Björn, Pleswischies, Andre, Rötzig-Zöllner, Meiven, Schreiber, Andreas, Unbekannter Benutzer (jaco_da), Unbekannter Benutzer (sire_ed), Zeidler, Petra, Behncke, Danny, Brandt, Hartmut, Fuchs, Benjamin, Graser, Maximilian, Heinrich, Lars, Köhler, Claas Henning, Künemund, Meren, Malbaum, Olaf, Seth, Daniel, Steinmetz, Franz, Urlings, Thomas

Latest Questions

Experience with Django framework question software-engineering django

I want to upstream a (small) patch, what form of signoff do I need from whom? — I have a patch for an Open Source tool that makes the tool run better on Solaris 11. I want to contribute that patch back to the project that makes the tool. Who do I need to ask for sign-off to be allowed to contribute the patch? Should I submit it as DLR employee or privately? question software-engineering open-source

Perl Distribution für Windows im DLR — I need a Perl distribution for windows, is there a recommendation regarding Perl at DLR? question software-engineering perl

Einführung von Versionsverwaltung question software-engineering

Was sollte an Mindestvorgaben für das Software-Testen etabliert werden? question software-engineering testen

Powered by Atlassian Confluence 5.10.5 · Fehler/Anfragen · Atlassian-News

Atlassian

Key Messages

Our approach at DLR is based on

1. First offer targeted information to the employees
2. Afterwards provide time and space for peer to peer discussions and knowledge exchange
3. Only afterwards rely on a formal process and directions given „from above“

Feedback

- Positive evaluation of current actions
- Tips, hints and specific *action items* for further steps

Our approach is copied by others (Helmholtz-Community etc.)



Thank You!

Questions?

Andreas Schreiber (@onyame)

Head of Department

Andreas.Schreiber@dlr.de

Carina Haupt (@caha42)

Head of Software Engineering Group

Carina.Haupt@dlr.de

DLR Intelligent and Distributed Systems

<http://www.DLR.de/sc/ivs>